

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

1. (previously presented): A space cross-connect unit (Z) with N input ports ( $E_i$ ) and P output ports ( $S_i$ ), comprising:

a broadcast stage comprising at most N signal dividers ( $A_i$ ) each having one input and C outputs where C is an integer factor of P less than P, each input being connected to one of said N input ports ( $E_i$ ) so that each of said at most N dividers ( $A_i$ ) divides a signal received at one of said N input ports ( $E_i$ ) into C signals at said C outputs, and

a space switching stage comprising at most C space switching modules ( $B_i, B'_i$ ),

said space cross-connect unit is characterized in that:

the space switching modules ( $B_i, B'_i$ ) are non-blocking and non-broadcasting, and

each of said space switching modules ( $B_i, B'_i$ ) has N inputs and P/C outputs, said N inputs are connected to N outputs of said broadcast stage, each of said N outputs comes from a different divider ( $A_i$ ) of said at most N dividers, and each of said P/C outputs of said space switching modules ( $B_i, B'_i$ ) is connected to a respective one of said P output ports ( $S_i$ ), wherein said space cross-connect unit is operable to perform packet switching and circuit switching, and wherein said space cross-connect unit is adapted to provide broadcasting of input signals to said output ports ( $S_i$ ) independently of spectral considerations.

2. (Original) A cross-connect unit (Z) according to claim 1, comprising exactly N dividers ( $A_i$ ) and C modules ( $B_i, B'_i$ ).

3. (previously presented) A cross-connect unit (Z) according to claim 1, characterized in that each of said space switching modules ( $B_i, B'_i$ ) comprises means for connecting each of its N inputs to one of its P/C outputs.

4. (Previously presented) A cross-connect unit (Z) according to claim 1, characterized in that each of said space switching modules ( $B_i, B'_i$ ) is a non-blocking switching matrix ( $B_i$ ) with N inputs and P/C outputs.

5. (Previously presented) A cross-connect unit (Z) according to claim 1, characterized in that each of said space switching modules ( $B'_i$ ) comprises:

K non-blocking switching matrices ( $F_i$ ) with N/K inputs and P/C outputs, where K is an integer factor of N; and

P/C non-blocking switching matrices ( $G_i$ ) with K inputs and one output, each of said K inputs being connected to a respective output of each of said K switches ( $F_i$ ).

6. (Previously presented) A cross-connect unit (Z) according to claim 1, characterized in that at least one of said space switching modules ( $B'_i$ ) comprises:

K non-blocking switching matrices ( $F_i$ ) with N/K inputs and P/C outputs, where K is an integer factor of N; and

P/C non-blocking switching matrices ( $G_i$ ) with K inputs and one output, each of said K inputs being connected to a respective output of each of said K switches ( $F_i$ ).

7. (previously presented) A cross-connect unit (Z) according to claim 5, characterized in that said P/C switching matrices ( $G_i$ ) are semiconductor optical amplifier (SOA) switches.

8. (Original) A cross-connect unit (Z) according to claim 1, characterized in that said number N of input ports is equal to said number P of output ports.

9. (Original) A cross-connect unit (Z) according to claim 5, characterized in that K is equal to C.

10. (Original) A cross-connect unit (Z) according to claim 1, characterized in that said switching stage uses a technology based on  $\text{LiNbO}_3$ .

11. (previously presented) A cross-connect unit (Z) according to claim 1, characterized in that each of said P/C outputs of said space switching modules ( $B_i$ ,  $B'_i$ ) is followed by an amplifier ( $D_S$ ).

12. (previously presented) A cross-connect unit according to claim 1, characterized in that the input of each divider is preceded by an amplifier ( $D_E$ ).

13. (previously presented) A cross-connect unit (Z) according to claim 1, characterized in that each of said space switching modules ( $B_i$ ,  $B'_i$ ) comprises:

a first stage comprising polarization-maintaining space switching matrices ( $M_1, \dots, M_K$ );

and

a second stage comprising polarization-maintaining semiconductor optical amplifiers (MQWSOA<sub>1</sub>, ..., MQWSOA<sub>k</sub>).

14. (Previously Presented) A signal transmission system comprising a cross-connect unit (Z) according to claim 1 and characterized in that said system comprises:

at least one multiplexer for multiplexing M signals having M different wavelengths ( $\lambda_i$ )<sub>1 ≤ i ≤ M</sub>, where M is an integer less than or equal to N;

at least one erbium-doped fiber amplifier (EDFA) for amplifying the multiplexed signal;

and

at least one demultiplexer for demultiplexing the multiplexed signal to yield M demultiplexed signal that are input to M input ports of said cross-connect unit.

15. (previously presented) A cross-connect unit (Z) according to claim 6, characterized in that said P/C switching matrices ( $G_i$ ) are semiconductor optical amplifier (SOA) switches.

16. (currently amended): A space cross-connect unit (Z) with N input ports ( $E_i$ ) and P output ports ( $S_j$ ), comprising:

a broadcast stage comprising a number of signal dividers ( $A_j$ ) each having one input and C outputs where C is an integer factor of P less than P, each input being connected to one of said

N input ports ( $E_i$ ) so that each of said dividers ( $A_i$ ) divides a signal received at one of said N input ports ( $E_i$ ) into C signals at said C outputs, and

a space switching stage comprising at most C space switching modules ( $B_i, B'_i$ ),

said space cross-connect unit is characterized in that:

the space switching modules ( $B_i, B'_i$ ) are non-blocking and non-broadcasting, and

each of said space switching modules ( $B_i, B'_i$ ) has N inputs and P/C outputs, said N

inputs are connected to N outputs of said broadcast stage, and each of said P/C outputs of said

space switching modules ( $B_i, B'_i$ ) is connected to a respective one of said P output ports ( $S_i$ ),

wherein said space cross-connect unit is operable to perform packet switching and circuit

switching, and wherein said space cross-connect unit is adapted to provide broadcasting of input signals to said output ports ( $S_i$ ) independently of spectral considerations.

The cross-connect unit of claim 1, wherein said number of dividers is less than N.